



SELF-DRAINING SPOUT WITH VALVE FOR DISPENSING LIQUIDS



G00002

Field of the Invention

[0001] The present invention relates to liquid dispensing spouts. In particular, this invention relates to a self-draining liquid dispensing spout with a valve.

Background of the Invention

[0002] When dispensing liquids from containers, a spout may be used to direct the liquids to specific locations of an area or an object. An example of such an application is the lubrication of machinery with an oil can or "oiler" (FIG. 1A). Such an oil can consists of a container for its content (a lubricant) and a spout to direct the liquid to parts of machinery that require lubrication.

[0003] Application of the lubricant is performed by grasping the oiler and tipping it from its ready position while directing the dispensing tip of the spout at the parts of the machinery to be lubricated. The contents of the oiler will flow down the barrel of the spout by gravity, out the spout and is hence dispensed. When the oiler is returned to its ready position, the flow of the contents out the barrel of the spout ceases as the level of the lubricant is below the level of the opening of the dispensing tip of the spout.

[0004] However, due to the viscosity of the some liquids, excess liquid may cling to the exterior of the dispensing tip. When the oiler is returned to its ready position, the excess liquid will flow down the exterior of the barrel to the container leaving a residue on the exterior of the barrel and container. This makes it messy, difficult and inconvenient to subsequently grasp the container. Users of such liquid dispensers have to frequently wipe off the excess liquid from the exterior of the container or even to wrap absorbent material around the container to soak up the excess liquid. These measures to address the problems are not ideal.

[0005] This problem of excess liquids on the exterior of the container may also be seen in container-dispensers of other kinds of liquids such as household laundry liquid detergents and softeners. To solve this problem, a major manufacturer of household detergents, the Proctor & Gamble Company, as well as other inventors, have filed patents on plastic containers with self-draining spouts.

[0006] These inventions have a collar or sleeve to collect the excess liquids and a slot or hole in the dispensing barrel to allow the liquids to drain back into the container (FIG. 1B).

[0007] These inventions work well and have seen commercial success. These patented products as exemplified in FIG. 1B claim both the spout and container as one invention. However, they require the container be poured in only one general direction and a handle on the container directs and limits the user to this orientation of the container when dispensing the contents. This restriction is due to the self-draining spouts having the slot or hole for draining the excess liquid disposed in the same vertical plane as the handle. If the user disregards this restriction of pouring in the general prescribed direction, the contents of the container may spill out of the drainage slot or hole and splash, instead of being dispensed in a controlled manner.

[0008] As such, there are several desirable objectives of the present invention. One is to overcome the problem of excess liquids on the exterior of the dispenser and two, to allow pouring in any prescribed direction or orientation. Thus, an invention to dispense liquids that can eliminate or reduce the above problems will be welcome.

Summary of the Invention

[0009] The present invention seeks to provide a self-draining spout for dispensing liquids, said spout comprising a barrel with a dispensing end and a container end, a collecting means disposed circumferentially around exterior of said barrel, at least one perforation in wall of said barrel enclosed

by said collecting means, a valve disposed within said barrel, a resilient means co-acting with said valve, and
an engagement means for engaging a container, whereby when said spout is in a ready position, said collecting means, said at least one perforation, said valve and said resilient means allow liquids on exterior of said barrel to collect in said collecting means and drain through said at least one perforation into interior of said spout.

Brief Description of the Drawings

[0010] A preferred embodiment of the present invention will now be more fully described, by way of example, with reference to the drawings of which:
[0011] FIG 1A shows a typical oil can and FIG. 1B a commercially-available laundry container and dispenser, both representing the prior art; while FIG. 1C shows the present invention, a spout, connected to a container;
[0012] FIG. 2A illustrates the cross-sectional view of the present invention connected to a container, in the ready position;
[0013] FIG. 3 is the cross-sectional view of the preferred embodiment of the present invention connected to a container, in the dispensing position.
[0014] and
[0015] FIGS. 4A & 4B show other embodiments of the present invention.

Detailed Description of the Drawings

[0016] In accordance with the present invention, a preferred embodiment of the invention is described. In the following description, details are provided to describe the preferred embodiment. It shall be apparent to one skilled in the art, however, that the invention may be practiced without such details. Some of these details may not be described at length so as not to obscure the invention.
[0017] While some of the components of the composite and equipment used are described, it is clear that equivalent components or equipment,

similar in function, may be used as substitutes without departing from the scope or spirit of the invention.

[0018] There are several advantages of the preferred embodiment of the present invention. One advantage of the preferred embodiment is that drips from excess liquids on the exterior of the spout are collected and returned into the container, thus preventing a mess on the exterior of the container while conserving and reusing the liquid.

[0019] Another advantage is that, unlike the self-draining spouts in conventional laundry detergent containers, the present invention is not limited to being poured in one general direction. Yet another advantage is that, in the present invention, the returned liquids can be filtered before being returned into the container.

[0020] The present invention is a spout for dispensing liquids, which may be connected to a container containing the liquid to be dispensed.

[0021] Elements of the present invention may be made of metal, metallic alloys, plastic, composites, ceramics or any other suitable material as long as they are resistant to the liquids being dispensed or stored in the container to which the spout is attached.

[0022] Referring to FIG. 2, the present invention is a spout **100** with a barrel **110** having dispensing end **120** and a container end **130**. The barrel may also be thought of having two regions in relation to the container. The container portion of the barrel is proximal to the container while the dispensing portion of the barrel is distal to the container.

[0023] To understand the function of the present invention, it will be convenient to think of the spout in its ready position, with its vertical axis substantially vertical and having its dispensing end higher than its container end. However, the present invention will still work even if its vertical axis deviates from the vertical plane in the spout's ready position. Reference to the descriptions of elements being higher and lower than other elements is as commonly understood in the English language.

[0024] The container end of the spout may be permanently attached to a container, which is partially shown in dashed outline, is not part of the

present invention. The spout of the present invention may be permanently mated with a suitable container or an intermediate connection means by welding, frequency welding or affixed with a suitable adhesive as appropriate, depending on the materials used for the spout and the for the container or intermediate connection means.

[0025] The spout may also be detachably mated to the container through liquid-tight attachment means such as complementary screw threads **140** or lugs on the spout and container with O-ring gaskets or sealing flanges as necessary.

[0026] Disposed around the proximal portion of the barrel is a collecting means **150** for the collection of excess liquids on the exterior of the barrel. This collecting means comprises a liquid-tight wall **160** around the barrel with an inclined base **170**. In one embodiment, the collecting means resemble a funnel such as that shown in FIGS. 1 and 2.

[0027] The wall of the collecting means is open towards the dispensing end of the spout to collect any liquids draining by gravity down the barrel to pool at the inclined base of the collecting means.

[0028] Immediately next to the angle made by inclined base **170** of the collecting means with the barrel of the spout are one or more perforations **180** in the wall of the barrel. The advantageous locations of these perforations allow any liquids collected in the collecting means to return into the barrel and thence into the container.

[0029] While the present invention works with at least one perforation, increasing the number of perforations will allow a more rapid draining of the collected liquids into the container. A plurality of perforations may be evenly disposed around the circumference of the barrel. If there is only one perforation, then the incline of the base will slope towards that one perforation to allow for more complete drainage of the collected liquids.

[0030] The collecting means may also house a suitable filter material **190** within its walls to filter the collected liquids before the liquids are returned to the container. A flange **200** permanently joined to, or temporarily affixed

around, the top of the wall of the collecting means help to retain the filter material.

[0031] The filter material may be as simple as a fine mesh screen or glass wool to filter out solid particles such as dust and dirt, or it can be made of a mixture of materials, depending on the substances to be filtered out. For example, if the spout is used for dispensing organic lubricants and water is to be excluded from the collected lubricants, then a hydrophilic material can be incorporated into the filter material to absorb and hold water or other hydrophilic liquids while allowing the hydrophobic organic lubricants to return into the container.

[0032] The collecting means of the present invention allows the filter material of choice to be changed as necessary.

[0033] Within the barrel at the proximal portion of the spout is a valve **210** resting on a resilient means **220**.

[0034] The external cross-section or shape of the valve corresponds to internal cross-section or shape of the barrel just distal to (or above) it. The valve has one or more bores **230** through it in the vertical plane to allow liquids to flow through it when the spout is tipped to the dispensing position. The present invention may also have a plurality of bores through the valve; in such an embodiment, these bores in the valve can also has the secondary function of filtering particles larger than the diameter of the bores from the liquid when dispensing the liquid.

[0035] The compressive force of the resilient means **220** is carefully predetermined to allow the weight of the valve to slightly compress the resilient means in the ready position. In the preferred embodiment, the valve **210** is made of a machined, cast or investment-cast metal such as brass, stainless steel or aluminum, and the resilient means **220** is a coil spring made of stainless steel, resting on a spring support **240**. The spring support itself is perforated to allow passage of liquid through it.

[0036] In the ready position, the spout is attached to a container of the liquid to be dispensed. In this position, the weight of the valve **210** compresses

the resilient means **220** and the perforations **180** in the wall of the barrel are not occluded.

[0037] In dispensing the liquids (FIG. 3), the spout and container are tipped such that the dispensing end **130** of the spout is lower than the container end **120**. In this dispensing position, the liquid contents of the container will flow down the barrel of the spout and push against the valve **210**. The force of the liquid acting on the valve, the weight of the valve and the resilient means **220** co-act to force the valve towards the dispensing end of the spout. Being of good tight fit, the valve, when pushed against the wall of the barrel, occludes the perforations **180**, preventing any liquid from escaping the container via the perforations. Thus, the liquids can only flow through the bore **230** of the valve, through the distal portion of the barrel and out the dispensing end **130** of the spout.

[0038] While the force of liquid being dispensed contributes to moving the valve to its occluding position, the valve will still occlude the perforations **180** even if only a little liquid is left. Proper functioning of the valve in such a situation is ensured by the weight of the valve and the force of the resilient means pushing the valve against the wall of the barrel. Proper function of the present invention is assured by the horizontal cross-sections of the wall of the barrel and the valve being regular. In the preferred embodiment, the cross-sections of both the barrel wall and the valve are circular.

[0039] Even if the cross-sections of the barrel and valve are polygonal instead of circular, proper functioning of the present invention is assured as the resilient means will force the valve into a good liquid-tight fit with the barrel wall.

[0040] Thus, it can be seen that unlike self-draining spouts of the prior art, the use of a valve in the present invention obviates the need to dispense the liquids only in one general direction or orientation.

[0041] When dispensing viscous liquids such as heavy lubricants, these viscous liquids tend to cling onto the exterior of the tip and flow down the exterior of the barrel. Upon the container (and spout) being returned to the

ready position (FIG. 2), the excess liquid on the exterior of the barrel will flow down and collect within the collecting means. Any undesirable contaminants in the collected liquids can be filtered by suitable materials in the filter means.

[0042] As previously described, when returned to the ready position, the valve does not occlude the perforations in the wall of the barrel and the collected liquids can return via the perforations, into the interior of the barrel and thence into the container.

[0043] While the preferred embodiment described has a regular, circular cross-section and a regular, even taper from container end to dispenser end, other embodiments are possible, such as a barrel with a polygonal cross-section. The present invention only necessitates that the proximal portion of the spout containing the valve be regular in its taper and cross-section. The distal portion may be irregular, curved or bent as dictated by the application in which the spout is used. The resilient means and the weight of the valve ensure that the perforations are occluded when the spout is in the dispensing position.

[0044] As the present invention described and claimed is a spout, it may be affixed to any suitable container or retrofitted to existing containers. Such embodiments of the present invention can be manufactured with complimentary engagement means to mate them to various containers and such embodiments are within the scope of the present invention.

[0045] The resilient means and the valve may be changed to suit liquids of different viscosities or the resilient means can also be replaced when worn, extending the versatility and useful life span of the present invention. While a coil spring is described, other suitable resilient means such as leaf springs may also be used. Such other resilient means may be molded with the spout (FIG. 4A; 250) or inserted separated and resting on the spring support.

[0046] At the dispensing end of the spout, other attachments such as shower-head-type attachments (FIG. 4B 260) may be affixed at the dispensing end 130 of the spout, depending on the desired application

[0047] While the example of dispensing lubricants was used in the description of the preferred embodiment, the present invention may be also be used for the dispensing of other liquids, particularly those that are viscous where they can cause a mess, or for liquids that are expensive, where collection of excess liquid is desirable.

[0048] It can thus be seen that the present invention comprising the barrel, the collecting means, the perforations, the valve, and the resilient means allow liquids to be dispensed and any excess collected and returned into the container without any mess is advantageous. In addition, the present invention also provides a means to filter undesirable contaminants from the liquids before they are returned into the container. The present invention thus allows users to overcome, or at least alleviate, the problems of the prior art.

[0049] It can be appreciated that although one preferred embodiment has been described in detail, various modifications and improvements can be made by a person skilled in the art without departing from the scope of the present invention.

Claims

1. A self-draining spout for dispensing liquids, said spout comprising:
 - a barrel with a dispensing end and a container end;
 - a collecting means disposed circumferentially around exterior of said barrel, closer to said container end than said dispensing end;
 - at least one perforation in wall of said barrel enclosed by said collecting means;
 - a valve disposed within said barrel;
 - a resilient means co-acting with said valve, and
 - an engagement means for engaging a container, wherebywhen said spout is in a ready position, said collecting means, said at least one perforation, said valve and said resilient means allow liquids on exterior of said barrel to collect in said collecting means and drain through said at least one perforation into interior of said spout.
2. The self-draining spout according to Claim 1, cross-section of said barrel being substantially circular or polygonal, said barrel essentially tapering in cross-section from said container end to said dispensing end.
3. The self-draining spout according to Claim 1, said collecting means further comprising a wall and an inclined base defining a space circumferentially around exterior of said barrel, said space opened towards said dispensing end of said barrel and closed by said inclined base towards said container end of said barrel.
4. The self-draining spout according to Claim 3, said collecting means further comprises a filter means.
5. The self-draining spout according to Claim 1, said at least one perforation advantageously located to allow maximal drainage of liquids into said interior of said spout.

6. The self-draining spout according to Claim 1, said valve possessing at least one bore in the vertical plane, weight of said valve predetermined to compress said resilient means when said spout is in said ready position such that said at least one perforation is not occluded by said valve.
7. The self-draining spout according to Claim 1, said collecting means, said at least one perforation, said valve and said resilient means located substantially together in the proximal portion of said barrel, said proximal portion nearer said container end of said barrel than said dispensing end.
8. The self-draining spout according to Claim 7, said proximal portion of said barrel being substantially regular in cross-section.
9. The self-draining spout according to Claim 1, said resilient means further comprises a spring.
10. The self-draining spout according to Claim 1, said resilient means further comprises a spring and a spring support.
11. The self-draining spout according to Claim 1, said engagement means comprises screw threads, lugs, gaskets and flanges.
12. The self-draining spout according to Claim 1, whereby when said spout is in the dispensing position,
 - gravity and said resilient means force said valve tightly into barrel towards said dispensing end,
 - said valve occludes said at least one perforation and prevents exit of said liquids through said at least one perforation, instead,
 - said valve permits liquid from said container end of said spout to flow through said at least one bore of said valve, through said interior of said barrel, to said dispensing end of said barrel.

13. The self-draining spout according to Claim 1, whereby when said spout is returned to said ready position,

gravity and weight of said valve compresses said resilient means and un-occludes said at least one perforation, thereby

gravity drain presence of said liquids on said exterior of said barrel to collect via said collecting means, then to drain through said at least one perforation and thence into said interior of said barrel.